Scottish Renewables Marine Energy Conference
the next steps

scottish marine renewables road map

SCOTTISH renewables

HIE
Highlands and Islands Enterprise
Iomairt na Gàidhealtachd 's nan Eilean

Marine Energy Group
Marine Energy Road Map

Lynne Vallance

The Scottish Government

Scotland's Targets

Climate Change Targets:

80% reduction in greenhouse gas emissions by 2050

Interim target of 42% emissions reduction by 2020

The most ambitious targets set by any Government

Renewable Energy Targets:

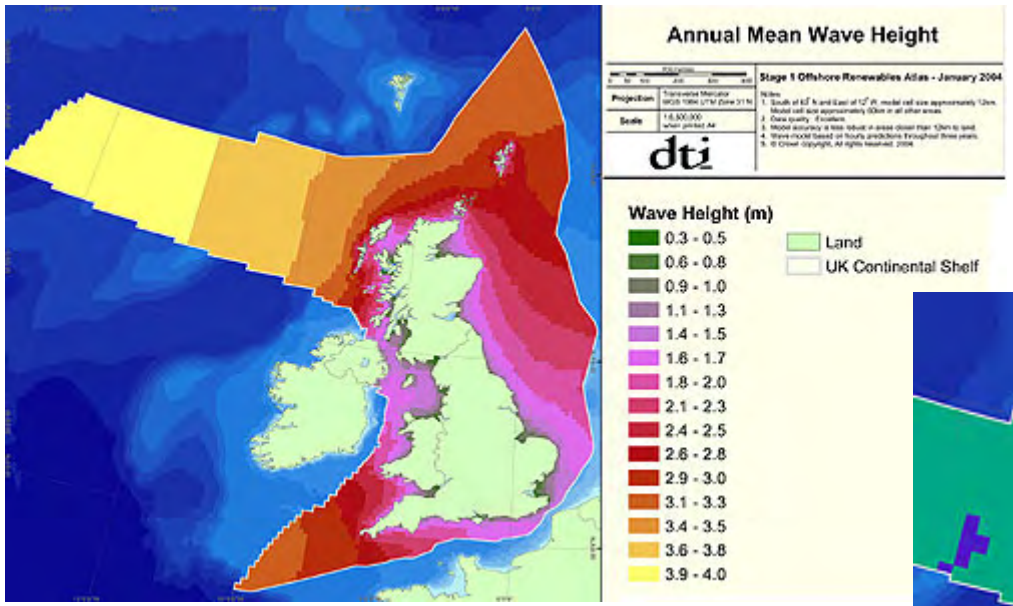
50% of demand for Scotland's electricity to be met from renewable sources by 2020

Interim milestone of 31% set for 2011 – representing 5GW

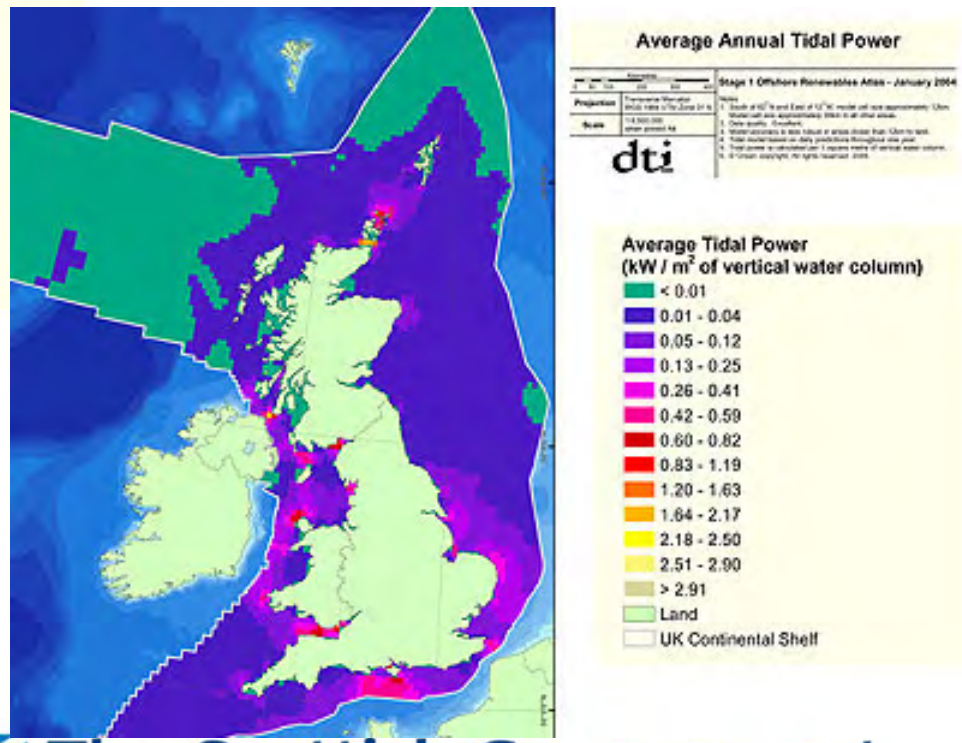
2011 target already exceeded with projects installed, consented and under construction

The Scottish Government

Scotland's Marine Resource



10% Europe's wave potential (7.5GW)



25% Europe's tidal stream potential (14GW)

25% Europe's offshore wind potential (25GW)

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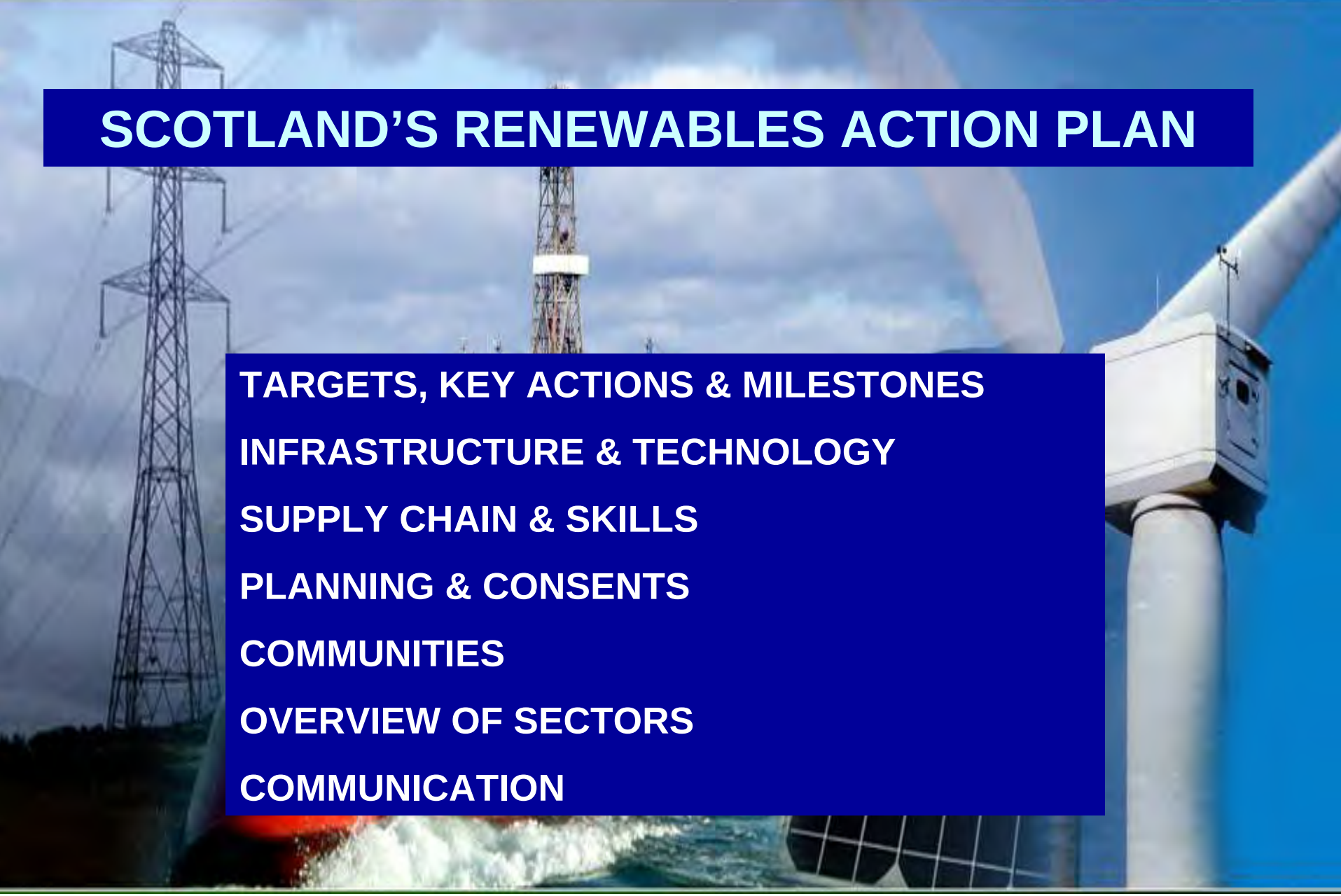


SCOTLAND'S RENEWABLES ACTION PLAN

TARGETS, KEY ACTIONS & MILESTONES

INFRASTRUCTURE & TECHNOLOGY

SUPPLY CHAIN & SKILLS

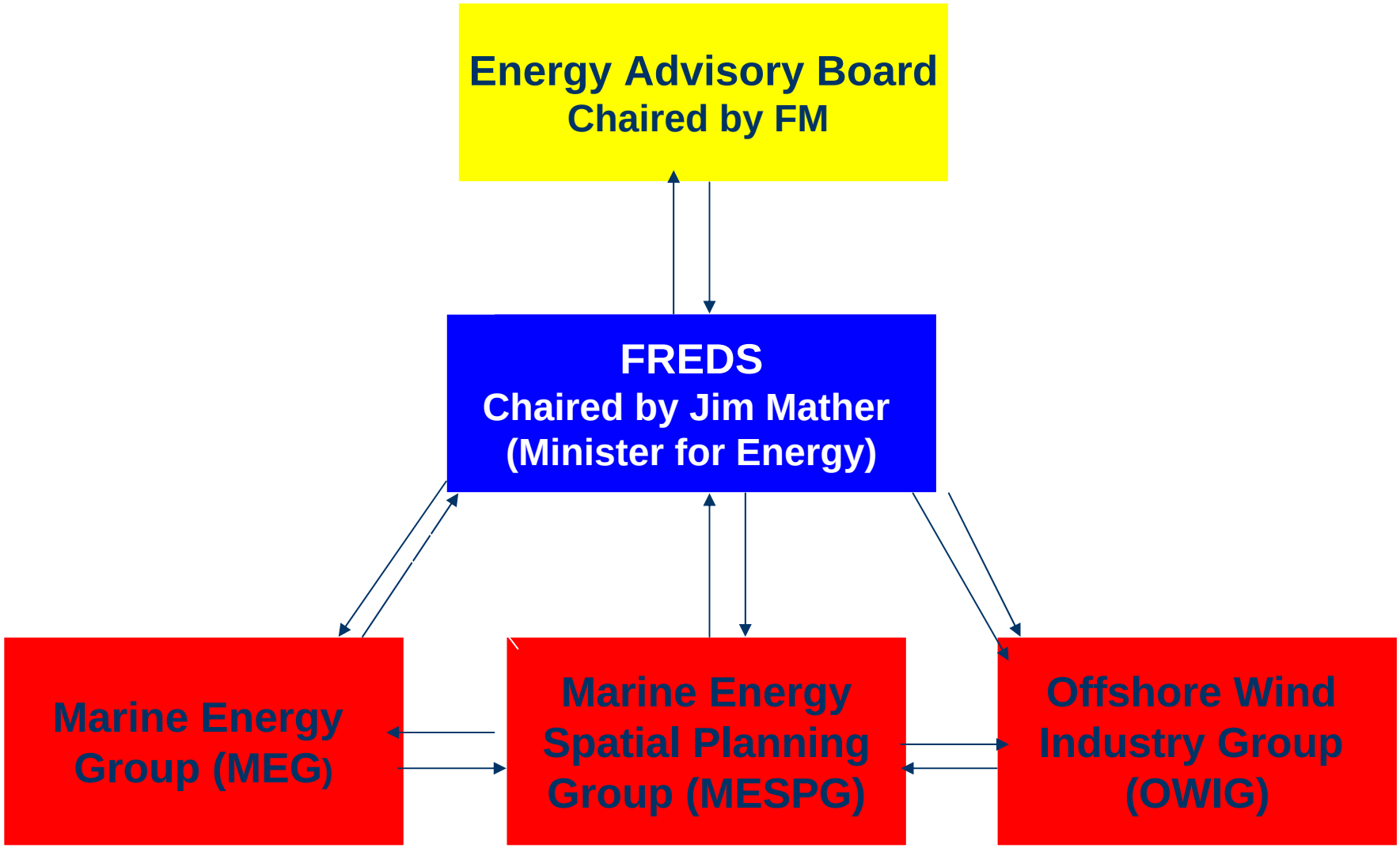
PLANNING & CONSENTS

COMMUNITIES

OVERVIEW OF SECTORS

COMMUNICATION

The Scottish Government



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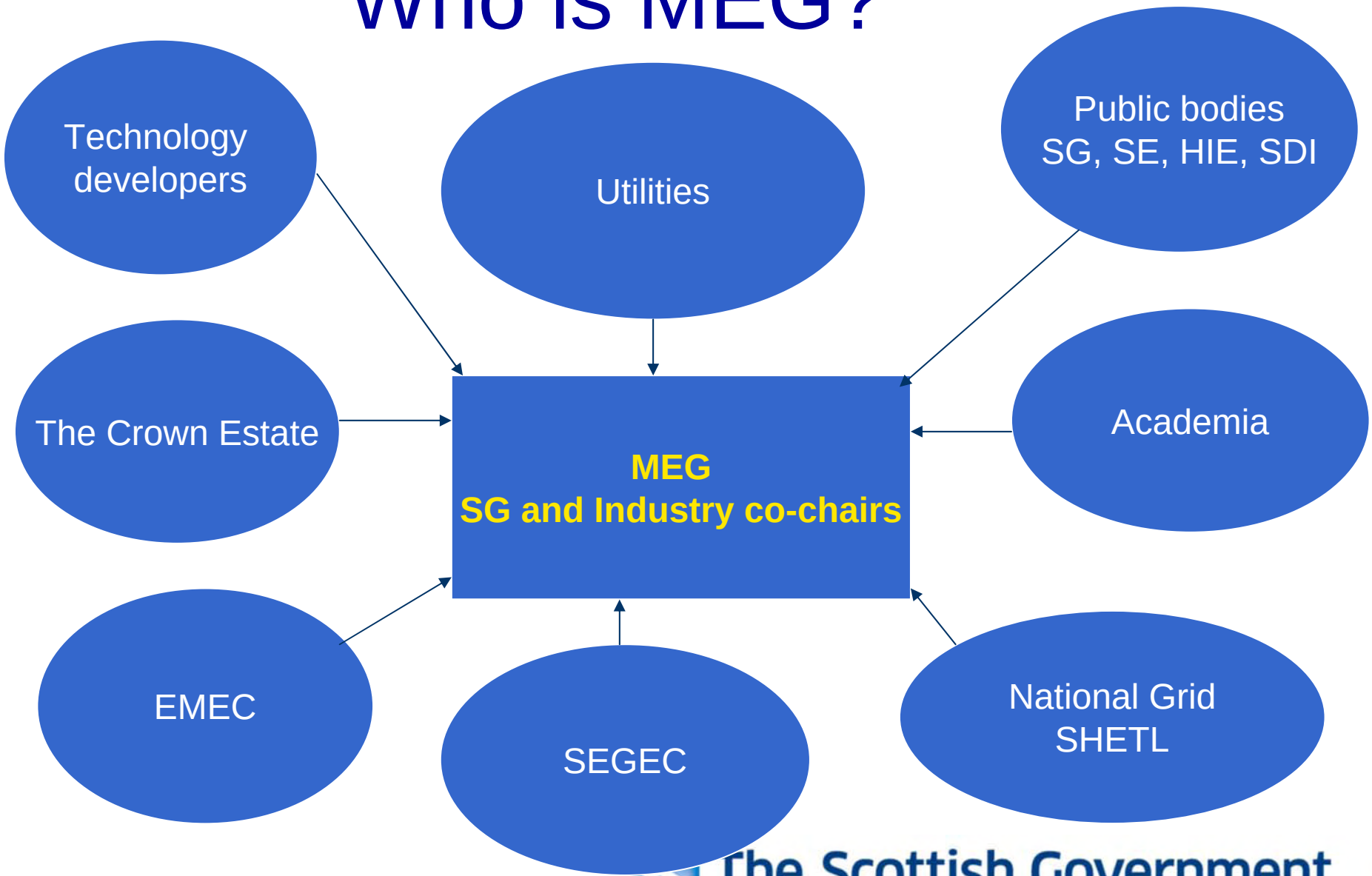
What's happening in Scotland

- Marine leasing round – 700MW by 2020 from Pentland Firth/Orkney Waters;
- Strategic overview of grid infrastructure for offshore renewables in Scotland;
- Ports and Harbours infrastructure study;
- Identifying supply chain needs
- Saltire Prize

The Scottish Government

Who is MEG?



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MEG's Marine Energy Road Map

Published in August 2009

"To accelerate delivery of the world's leading marine energy industry that will provide a substantial contribution to the sustainable economy and environment of Scotland."

A series of recommendations to Scottish and UK Governments as well as key players in the marine sector to support industry meet its aspirations by 2020

Finance Recommendations

Stages 1-4

- **Continued funding for R&D**
- **SG should introduce a flexible WATES II scheme**
- **SG should review urgently ROC banding for tidal stream projects**
- **Treasury should release funds from Fossil Fuel Levy to support renewables, incl marine**

The Scottish Government

Grid Recommendations

- **SHETL on receipt of applications build:**
  - **new 132kv line from Northeast Caithness coast to Dounreay**
  - **new 132kv line from Orkney Islands to Dounreay**
- **Grid sub-group to strategically review Scotland's grid infrastructure to support marine energy**

The Scottish Government

Planning/Consents

- Consistency between MSPs, onshore plans and 'ecologically coherent network' of MPAs within Scottish and UK Marine Bills

- Prioritisation of MSPs in key development areas

- New streamlined consenting procedures available by end 2009

- Regulators should adopt a "deploy and monitor" approach to marine renewables

Infrastructure/Supply Chain

- EMEC to consider expansion of “pre-EMEC” testing sites
- Development plan for strategic sites identified within National Renewables Infrastructure Project
- Commissioning of stage 2 of MEG Supply Chain work
- SDI to pursue inward investors to plug identified gaps in supply chain
- MEG to engage with Skills Development Scotland Renewables group on required skills for marine sector

European Engagement

- EU-OEA and Scottish industry to build links for marine sector within the EU Commission
- Encourage EU to recognise potential of marine energy by funding further R&D and demonstration projects
- Consider building a strategic alliance with other European Regions to drive forward a European Road Map

EMEC ORKNEY

Current Activity

- Study on costs of wave and tidal projects
- Opening discussions with Commission allowing grant support + enhanced ROCs
- Ministerial led trade mission to Bremerhaven & stakeholder event to inform N-RIP
- Establishment of offshore grid group to strategically plan grid infrastructure
- Road Map presented to European Commission
- Contribution to European Road Map

The Scottish Government

Current activity

MESPG

- **Planning** - Marine Spatial Plan for Pentland Firth/Orkney Waters
- **Consents** - “One stop shop” for offshore renewables applications, guidance, deploy and monitor approach
- **Research** - monitoring guidelines, birds surveys,
- **Regions** – marine renewables initiative for the Outer Hebrides

The Scottish Government

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(*http://www.scotland.gov.uk/News/Releases/2009/08/26102551*)

The Scottish Government

Marine Energy Supply Chain Survey

Gregory Dudziak

Senior Renewable Energy Consultant

12 November 2009

IPA
Energy + Water Economics

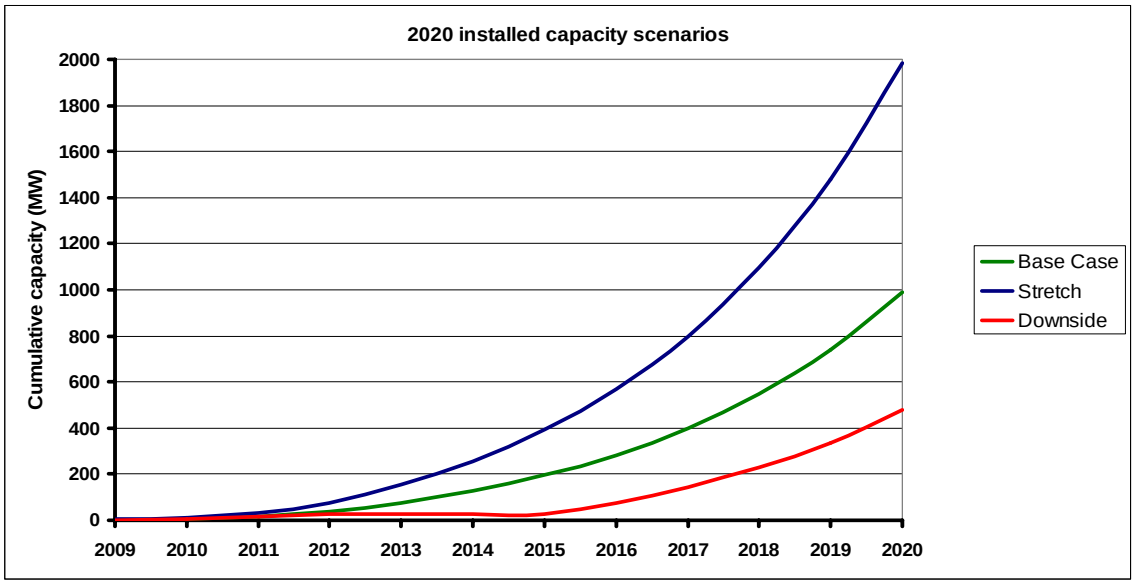
sgurr energy
Sustainable Engineering Worldwide

Background and Objectives

- FREDS Marine Energy Group Roadmap (http://www.scotland.gov.uk/Publications/2009/08/14094700/0)
- Marine Energy Supply Chain Survey (Ref 16 of above report)
- SgurrEnergy & IPA Energy and Water Economics report
- Main goals to the study were to:
  - Make a case for investment in the marine energy sector by evaluating the potential value of an established supply chain to the Scottish Economy
  - Stimulate the Marine Energy Supply Chain by demonstrating the size of the opportunity

Inputs and assumptions (1)

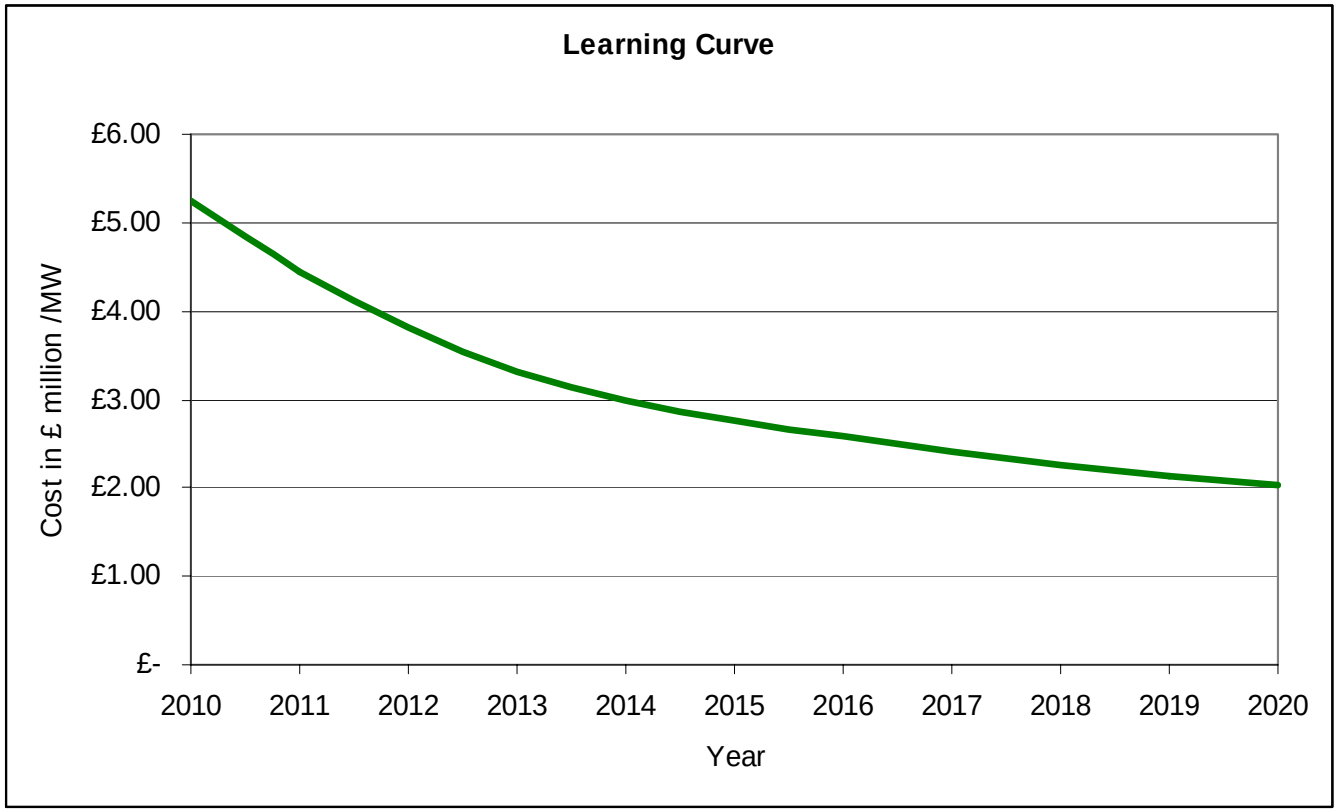
- Deployment scenarios by 2020 in Scottish waters:
  - "Medium": 1 GW ; "High": 2GW , "Low" 0.5 GW installed



- **CADMID** model for product life cycle (Concept , Assessment, Demonstration, Manufacture, In service, Disposal) applied to a 50 MW wave or tidal development. **Study's scope limited to CADM**

Inputs and assumptions (2)

- Capital cost learning curve (12.5% learning rate, £3m/MW in 2014)



- 20 direct jobs per MW of installed capacity (literature review + wind industry figures)

Industry Consultation

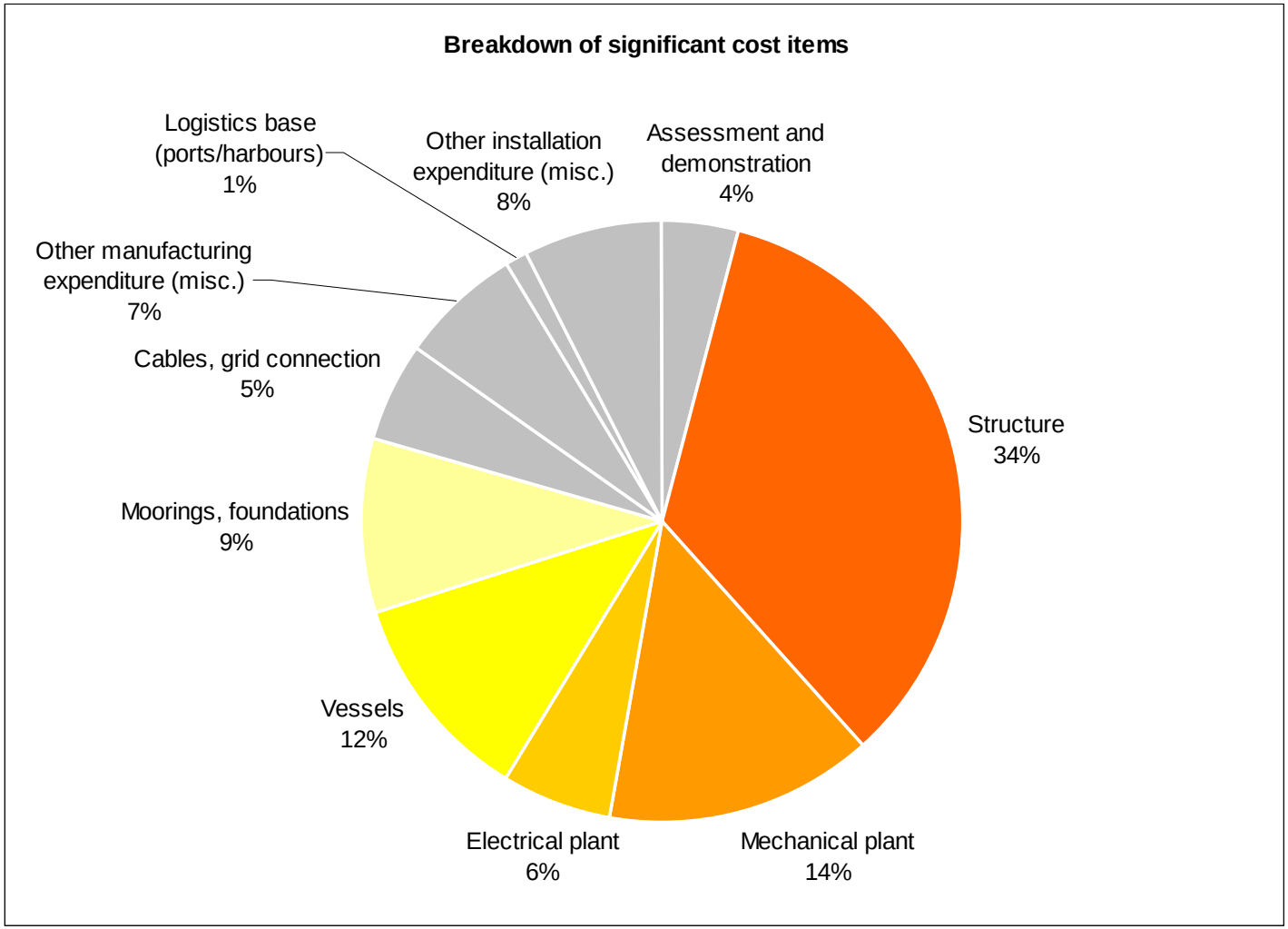
- 10 Technology Developers approached (5 Wave; 5 Tidal) in the procurement stage or having constructed full scale devices ; 6 responded
- Supply chain requirement (CADM) for a 50 MW project based on their respective technologies
- Supporting information such as research and development spending, primary material used, skills required, and estimate of induced jobs creation, if available.
- Supply chain source breakdown, first by company (in-house or external) and second by country of origin (Scotland, other UK, rest of Europe, rest of the world).

Consultation - Combined Response

- Supply Chain requirement estimates:
  - by CADM category (Mechanical / Electrical / etc…)
  - values (in £ and % of total cost)
  - source (in house / third party)
  - Origin (Scotland, other UK, EU, rest of the world)

			Value	Value	Source 1 - Company		Source 2 - Country			
CADMID		Broad Categories	Total	%	In-House	External/Third Party	Scotland	Other UK	EU	Other
Section 1					%	%	%	%	%	%
Concept		R&D spending	£ (*)							
	1	total spending to full scale prototype	12,833,333		8.5	91.5	40.7	15.0	44.0	0.3
	2	further spending to step up to a 2-3 MW facility	11,250,000		33.0	67.0	55.0	20.0	25.0	0.0
	3	further spending to step up to a 50 MW facility	5,250,000		52.5	47.5	30.0	60.0	10.0	0.0
			£/MW (**)	% (***)						
Assessment	4	Conceptual engineering	12,500	0.28	70.0	30.0	50.0	46.7	0.0	3.3
	5	Expert resource (e.g. academics, consultants etc.)	10,500	0.22	55.0	45.0	45.0	50.0	5.0	0.0
	6	Site/resource assessment and consents	30,000	0.76	17.5	82.5	58.3	41.7	0.0	0.0
	7	Other (Please specify)	0	0.00						
Demonstration	8	Detailed engineering	28,750	0.70	56.0	44.0	43.8	48.8	2.5	5.0
	9	Component testing	27,500	0.60	55.0	45.0	40.0	45.0	5.0	10.0
	10	Systems integration testing	26,250	0.59	48.8	51.3	56.7	33.3	0.0	10.0
	11	Verification/third party approvals	16,875	0.39	8.0	92.0	25.0	75.0	0.0	0.0
	12	Other (Please specify)	0	0.00						

Cost Items breakdown

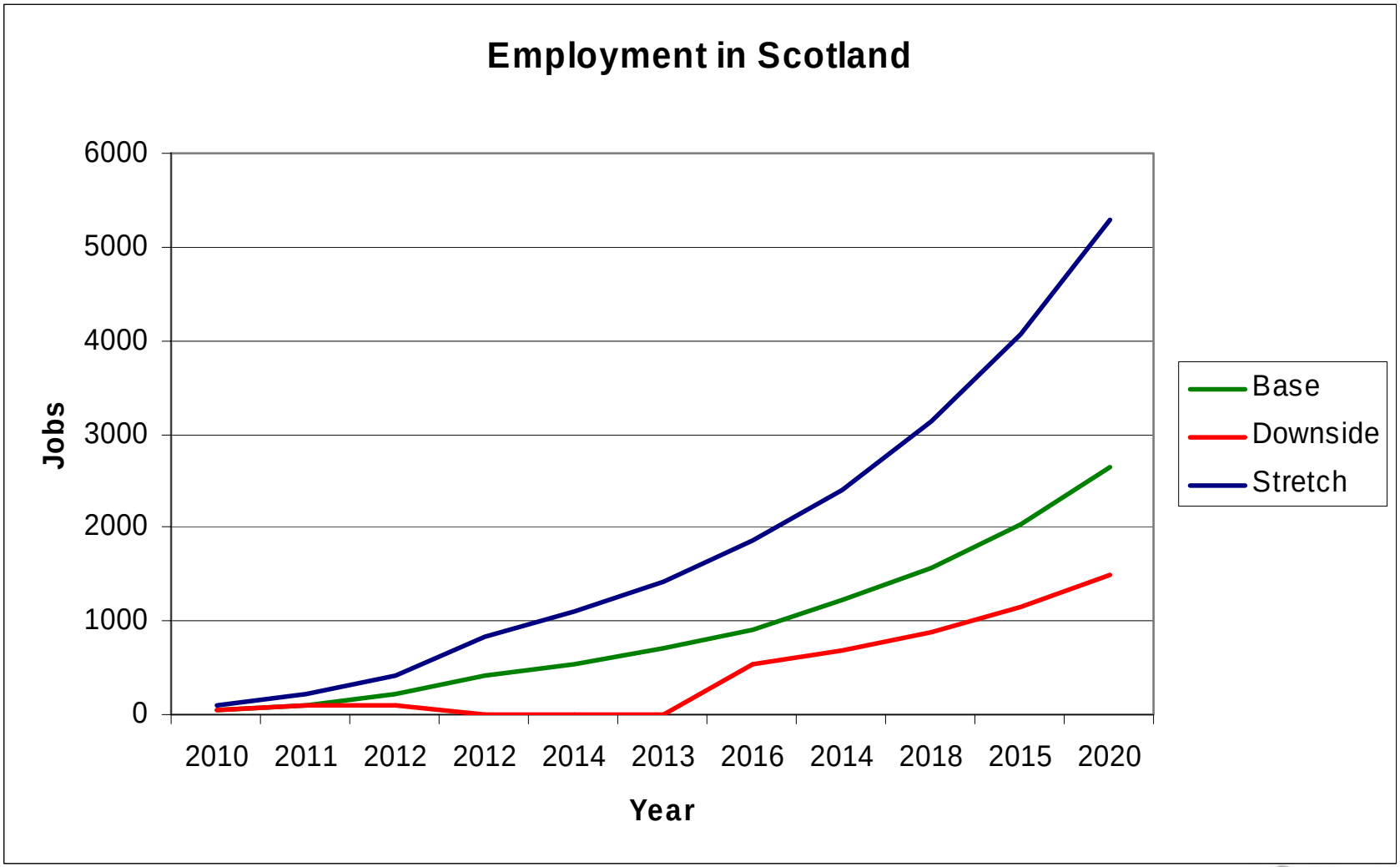


Expenditure by Origin

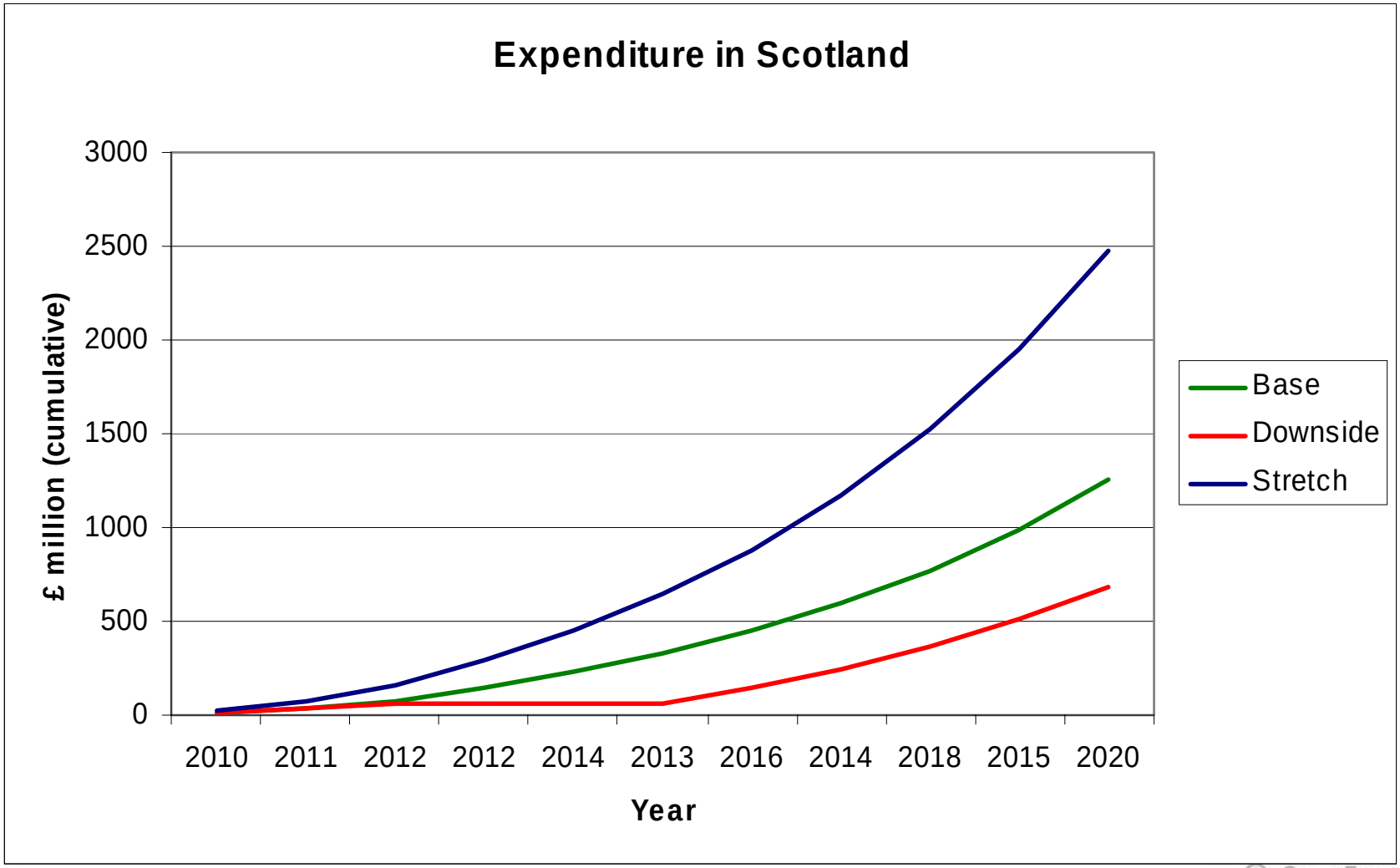
- Scotland: 53% retention factor
- Other UK: 30%
- Other EU: 16%
- Rest of World: 1%

- Areas where Scottish supply chain contribution is relatively low:
  - Mechanical plant (e.g. hydraulics, turbines): 11% Scotland;
  - Electrical plant (inc. generators, switchgear): 29.3% Scotland;
  - Cables, umbilicals and communications, grid connection: 31.5% Scotland;
  - Installation vessels (jackups, lift barges): 36.7% Scotland.

Employment Implications in Scotland



Expenditures Implications in Scotland



Risks and Uncertainties

- Which scenario will be achieved? - Many factors will influence the growth of the sector (See FREDS Marine Energy Roadmap and SgurrEnergy/IPA Supply Chain Survey report for full details)

- Positive Factors
  - Indirect & Induced jobs
  - R&D jobs and expenditure not included
  - “In-service” and “Decommissioning” phases not included
  - Exported Capacity not included

- Negatives
  - Impact of learning curve on jobs creation per MW
  - Skills shortage

Conclusions

- The Marine Renewables Industry can make a strong contribution (jobs and expenditure) to Scotland's economy
- 53% of overall capital expenditure could be retained in Scotland – good start but can be increased
- Supply Chain Engagement required
- Job creation will rely on the availability of a skilled workforce (training / skills transfer / competing sectors)

Acknowledgements

- Marine Energy Group

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- Consultees

- Colleagues at SgurrEnergy (John Simmons) and partners at IPA (Alice Waltham and Colin Barnes)

Any questions?

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